REMARKS

STATUS OF THE CLAIMS

Claims 3-19 are pending in the application.

Claims 3-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

Claims 3-15 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Patent No. 5, 555,362) in view of Ohsawa (U.S. Patent No. 4,876,610) and Wada (U.S. Patent No. 5,949,922).

Claims 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamashita (U.S. Patent No. 5, 555,362) in view of Ohsawa (U.S. Patent No. 4,876,610), Wada (U.S. Patent No. 5,949,922), and Graham (U.S. Patent No. 5,222,154).

Claims 3, 5, 18 and 19 are amended. Thus, claims 3-19 remain pending for reconsideration, which is respectfully requested.

No new matter has been added in this Amendment.

INDEFINITENESS REJECTION

Independent claims 3, 18 and 19 are rejected under 35 USC 112, second paragraph, for being indefinite. The Office Action alleges that because of use of the phrase "generating a list storing at least one of center-of-gravity information ... and boundary box information," if the center-of-gravity information was not generated, it would not be possible to perform the claimed recitation, "calculating a halftone dot density in a given area by referring to the center-of-gravity information."

Regarding the indefiniteness rejection and use of the "center-of-gravity information about centers of gravity of halftone dots" independent claims 3, 18, and 19, using claim 3 as an example, are amended as follows:

> ... generating a list of halftone dot information comprising ~~storing at least one of~~ center-of-gravity information about centers of gravity of halftone ~~dots and boundary box information~~, as information about each recognized halftone dot ~~in the recognized halftone dot image area~~, ...

Support for the claim amendments can be found, for example, in FIG. 2 and page 10 to page 13, line 25 of the present Application. Accordingly, amended independent claims 3, 18,

and 19 are definite under 35 USC 112, second paragraph, by particularly pointing out and distinctly claiming the subject matter which applicant regards as the invention.

Further, in view of the amendments to independent claim 3, dependent claim 5 is amended as follows:

> 5. (CURRENTLY AMENDED) The image processing apparatus according to claim 3,
>
> wherein the generated list further comprises boundary box information, as information about each halftone dot in the recognized halftone dot image area,
>
> wherein said halftone dot image ~~are~~area map creating unit performs a first process of painting out a boundary box and a second process of painting out a portion expanding from the boundary box on the basis of the boundary box information, the boundary box and the portion that have been painted out being included in the binarized halftone dot image.

In view of the claims amendments, withdrawal of the indefiniteness rejection is respectfully requested.

CITED REFERENCE REJECTIONS

Claims 3-15 and 18-19 are rejected under 35 USC 103(a) as being unpatentable over Yamashita (US Patent No. 5,555,362) in view of Ohsawa (US Patent No. 4,876,610) and Wada (US Patent No. 5,949,922). Yamashita and Wada are newly cited, and, thus, newly relied upon.

Claims 16-17 are rejected under 35 USC 103(a) as being unpatentable over Yamashita in view of Ohsawa, Wada, and Graham (US Patent No. 5,222,154).

Although the Office Action newly relies on Yamashita and Wada, the Office Action in page 6 maintains, from the previous Office Actions, Ohsawa, FIGS. 5A and 5B, and column 4, lines 42-45 and lines 60-66, for rejecting the claimed present invention's:

> ... generating a list of halftone dot information comprising ~~storing at least one of~~ center-of-gravity information about centers of gravity of halftone dots ~~and boundary box information~~, as information about each recognized halftone dot ~~in the recognized halftone dot image area~~,
>
> calculating a halftone dot density in a given area by referring to the center-of-gravity information, and
>
> ***deleting corresponding halftone dot information from the halftone dot image area map and the halftone dot information list, when the halftone dot density does not meet a given condition*** ... (e.g., claim 3, emphasis added)

As also discussed in the previous Amendment, Ohsawa compares the absolute value of difference in density between the central pixel and surrounding pixels, with a threshold value, as shown in FIG. 5B, to discriminate between characters and screen dots (edge area) and photographs and background (non-edge area) (Ohsawa, Column 4, lines 35-66, which is relied upon by the Office Action). However, Ohsawa does not perform the claimed present invention's, "***deleting corresponding halftone dot information from the halftone dot image area map and the halftone dot information list, when the halftone dot density does not meet a given condition.***" The Office Action alleges that Ohsawa's discrimination of pixels that belong to characters and screen dots (edge portions) from photographs and background (non-edge portions) (column 3, lines 50-53), is similar to the claimed present invention's, "***deleting corresponding halftone dot information from the halftone dot image area map and the halftone dot information list, when the halftone dot density does not meet a given condition.***" However, the claimed present invention's, "deleting ... halftone dot information" relates to improving an already recognized halftone dot. In other words, Ohsawa's pixel discrimination technique would be used in the claimed present invention's, "***recognizing a halftone dot image area*** in a multi-valued image," but Ohsawa fails to disclose or suggest the claimed present invention's elimination of erroneously recognized, for example, due to noise or dust, halftone dots.

The Office Action, in the Response to Arguments, suggests that there is no specific limitation in claim 3 that limits the invention to recognition of errors in halftone dot detection due

to noise or dust. In view of page 9, line 9 to page 15, line 9, and page 17, lines 10-16, of the present Application, the independent claims 1, 18, and 19, using claim 1 as an example, are further amended for clarity as follows:

3. (CURRENTLY AMENDED) An image processing apparatus processing a binary image, comprising:

an input unit that inputs the binary image as a multi-valued image;

a halftone dot image area map creating unit controlling the image processing apparatus to search for a halftone dot image area in the multi-valued image according to a process, comprising:

recognizing ~~a~~ halftone ~~dot image area~~dots in the multi-valued image,

~~creating a halftone dot image area map,~~

generating a list of halftone dot information comprising ~~storing at least one of~~ center-of-gravity information about centers of gravity of halftone ~~dots and boundary box information~~, as information about each recognized halftone dot ~~in the recognized halftone dot image area~~,

eliminating an erroneously recognized halftone dot according to a process, comprising:

calculating a halftone dot density in a given area by referring to the center-of-gravity information in the list of halftone dot information, and

deleting corresponding halftone dot information from ~~the halftone dot image area map and~~ the halftone dot information list, when the halftone dot density does not meet a given ~~condition;~~condition, and

creating a halftone dot image area map according to the halftone dot information list from which the erroneously recognized halftone dot has been eliminated;

a line drawing/character area map creating unit that searches for a line drawing/character image area in the multi-valued image and creates a line drawing/character image area map;

a halftone dot image binarizing unit that binarizes an input image corresponding to the halftone dot image area map ~~as corrected by the deleting~~created based upon the eliminating the erroneously recognized halftone dot, while suppressing input read errors occurred when said input unit ~~input~~inputs the binary image by optimizing a value of a target pixel to be binarized, and generates a binarized halftone dot image;

a line drawing/character smoothing unit that smoothes a jaggy contained in an input image corresponding to the line drawing/character area map, and generates a binarized line drawing/character image; and

an image combining unit that combines the binarized halftone dot image and the binarized line drawing/character image (claim 3).

In contrast to Ohsawa (as well as Yamashita and Wada), the claimed present invention provides:

> ... a halftone dot image area map creating unit controlling the image processing apparatus ***to search for a halftone dot image area in the multi-valued image*** according to a process, comprising:
>
> ***recognizing ~~a halftone dot image area~~dots*** in the multi-valued image,
>
> ~~creating a halftone dot image area map,~~
>
> ***generating a list of halftone dot information comprising ~~storing at least one of~~ center-of-gravity information about centers of gravity of halftone dots~~ and boundary box information~~***, as information about each recognized halftone dot ~~in the recognized halftone dot image area~~,
>
> ***eliminating an erroneously recognized halftone dot according to a process, comprising:***
>
> calculating a halftone dot density in a given area by referring to the center-of-gravity information in the list of halftone dot information, and
>
> deleting corresponding halftone dot information from ~~the halftone dot image area map and~~ the halftone dot information list, when the halftone dot density does not meet a given ~~condition;~~condition, and
>
> ***creating a halftone dot image area map according to the halftone dot information list from which the erroneously recognized halftone dot has been eliminated;***
>
> ...
>
> (e.g., amended independent claim 3, emphasis added).

Yamashita discloses a method of extracting a tree structure by using image analysis results of an actual document and generating a flexible layout model. Columns 3 and 4 of Yamashita, which are relied upon in the Office Action, discuss layout model generation techniques of an input image, for example, "The image area can be separated from the character area by using a characteristic value such as the neighborhood line density as reported in the existing method" (column 4, lines 59-67). Therefore, although, Yamashita discusses using line density information, similar to Ohsawa, the line density information is used for discriminating between an image area and a character area in an input image, such that Yamashita fails to disclose or suggest the claimed present invention's, ***"eliminating an erroneously recognized halftone dot according to a process, comprising:*** calculating a halftone dot density in a given area by referring to the center-of-gravity information in the list of halftone dot information,

and ***deleting corresponding halftone dot information from*** ~~the halftone dot image area map and~~ ***the halftone dot information list,*** when the halftone dot density does not meet a given ~~condition;~~condition, and ***creating a halftone dot image area map according to the halftone dot information list from which the erroneously recognized halftone dot has been eliminated*** ..." (claim 3).

The Office Action in page 8, newly relies on Wada to reject the claimed present invention's, "a halftone dot image binarizing unit that binarizes an input image corresponding to the halftone dot image area map ~~as corrected by the deleting~~created based upon the eliminating the erroneously recognized halftone dot, while suppressing input read errors occurred when said input unit ~~input~~inputs the binary image, and generates a binarized halftone dot image."

The Office Action in page 8, relies on Wada, FIG. 12, S5 and column 14, lines 20-26, which discusses "calculating center of gravity." However, Wada is calculating a center of gravity of data in the window W over the oblique lines (FIG. 11) for position error measurement operations. The Office Action appears to allege that Wada's position error measuring, which uses center of gravity information of data of pixels, is an input read error corrected in Wada and, thus, similar to the claimed present invention's, "a halftone dot image binarizing ... while suppressing input read errors."

Also, the independent claims 3, 18, and 19, using claim 3 as an example, are further amended to emphasize a patentably distinguishing feature of the claimed present invention, as follows:

> ... a halftone dot image binarizing unit that binarizes an input image corresponding to the halftone dot image area map as ~~corrected by the deleting~~created based upon the eliminating the erroneously recognized halftone dot, ***while suppressing input read errors*** occurred when said input unit ~~input~~inputs the binary image ***by optimizing a value of a target pixel to be binarized***, and generates a binarized halftone dot image; ...

Support for these claim amendments can be found, for example, on page 17, lines 10-16, of the present Application.

Accordingly, Yamashita, Ohsawa, and Wada, either alone or as combined, fail to disclose or suggest the claimed present invention's, "***eliminating an erroneously recognized halftone dot according to a process, comprising:*** calculating a halftone dot density in a given area by referring to the center-of-gravity information in the list of halftone dot information, and ***deleting***

corresponding halftone dot information from ~~the halftone dot image area map and~~ the ***halftone dot information list***, when the halftone dot density does not meet a given ~~condition;~~condition, and ***creating a halftone dot image area map according to the halftone dot information list from which the erroneously recognized halftone dot has been eliminated*** ..." and "... a halftone dot image binarizing unit that binarizes an input image ... ***while suppressing input read errors*** occurred when said input unit ~~input~~inputs the binary image ***by optimizing a value of a target pixel to be binarized***, and generates a binarized halftone dot image; ..." (e.g., amended independent claim 3).

In view of the claims amendment and remarks withdrawal of the rejection of pending claims and allowance of pending claims is respectfully requested.

CONCLUSION

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

Respectfully submitted,
STAAS & HALSEY LLP

Date: April 25, 2005

By: _____
Mehdi Sheikerz
Registration No. 41,307

1201 New York Avenue, NW, Suite 700
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501

CERTIFICATE OF FACSIMILE TRANSMISSION
I hereby certify that this correspondence is being transmitted via facsimile to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450
on April 25, 2005
STAAS & HALSEY
By: Mehdi Sheikerz
Date: April 25, 2005